

# User manual

RTI DALI Connection  
With COMM-TEC Gateway  
**CTG-DALI**  
For RTI-Systems



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## 1. Range Of Functions CTG-DALI

The following functions and performances for DALI systems are available with the use of COMM-TEC gateways CTG-DALI for RTI systems:

DALI function description	CTG-DALI with AMC control and RTI driver software		Remarks
	Yes	No	
Addressing of DALI devices (1 system with 64 DALI devices)		x	With CTG-DALI and PC with Windows program CT-DALI-Grouper
Configuration threshold values Min/Max, system error value, other threshold values		x	
Definition of groups (up to 16 per DALI device)		x	
Change of scene values (up to 16 per DALI device)	x		Also possible with CT-DALI-Grouper
Access of groups, individual devices and broadcast with scene values, relative dimming and absolute value setting	x		
Set dimmer speed	x		
Set speed for start-up of scenes	x		
Access of DALI Min/Max values	x		
Analysis of acknowledgements such as lighting error, bus error, error in DALI device	x		
Operation via HTML	x		With individual programming
Operation via standard pushbuttons	x		
Operation via RTI touch panels	x		

## 2. Individual Steps For Successful Installation And Activation

Installation and activation of all hardware and software components takes place in 6 steps:

- 1) Installation and cabling DALI system
- 2) Installation DALI gateway
- 3) Installation RS232 interface
- 4) Activation DALI devices and CT-DALI-Grouper
- 5) Integration of driver software
- 6) Individual RTI programming

Following we defer to the individual steps; not all steps or parts thereof have to be performed by the RTI supplier. However, the tools provided by COMM-TEC allow for this.

### 2.1 Installation And Cabling DALI System

An installation company performs the electrical installation according to the regulations for high voltage current installations. Furthermore, the technical framework, such as the limitation of maximum participants per DALI line or cable length are to be observed.

The 2-core DALI control cable can be installed together with the high voltage current installation and is operated with low voltage (22.5V DC via CTG-DALI). For the DALI control cable no additional electrical installation tools, accessories, meters or testers are required. No special data cables have to be used; a common 5x1.5mm<sup>2</sup> NYM cable can be used as power supply cable for EVG and data cable for DALI. No polarity has to be observed, each EVG can be accessed individually, no group cabling is necessary (see figure 2.1.1).

After installation, the DALI system is addressed and configured, meaning that each DALI device gets its own address. In this way each DALI device can be assigned to max 16 groups. This configuration is made with the PC software CT-DALI-Grouper. The CTG-DALI can be integrated without further configuration into an existing DALI system. In this case the installation company has to define the group and scene functions. If the system is not yet configured, go to chapter 2.2.

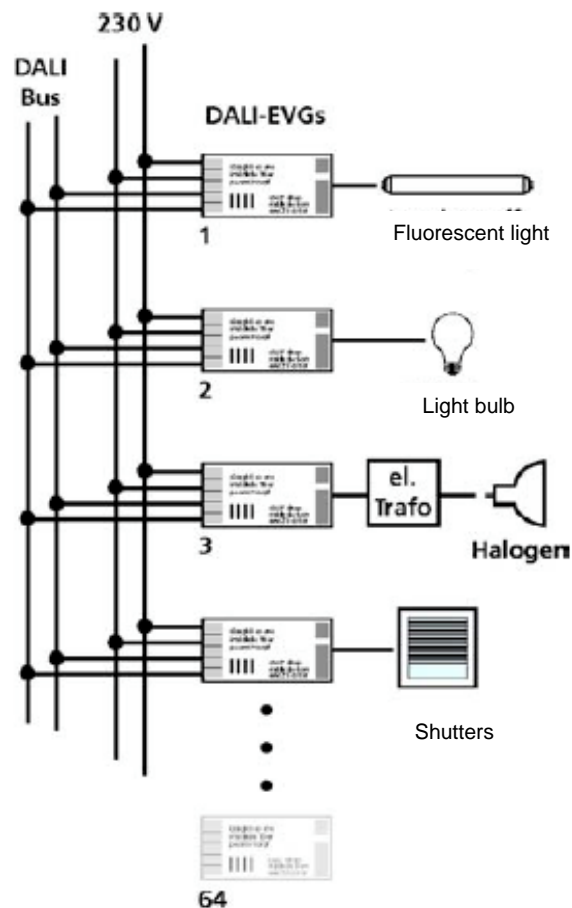


Figure 2.1.1

Technical specifications:

- DALI control cables: e.g. 2-core cable 2x1.5mm<sup>2</sup> NYM or any control cable
- Max. 64 DALI devices in one system
- Max. cable length DALI signal: 300m
- DALI power supply 22.5V DC
- Max. voltage drop DALI signal: 2V
- Max. power consumption DALI system: 250mA
- Max. distance DALI EVGs to fluorescent lights in separate array: 2m
- Max. distance DALI devices for phase control to light bulbs or halogen (high voltage/low voltage (power adaptor)): depending on lead resistance
- Wiring DALI: delta or series connection
- Communication speed 1200 bits/sec
- Tolerance of time specification is  $\pm 10\%$ .

## 2.2 Installation DALI Gateway

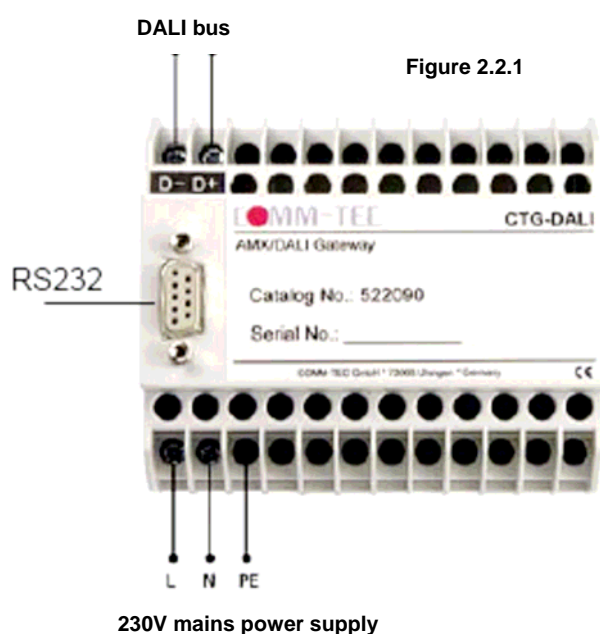
The DALI gateway is mounted on a DIN rail inside the switchgear cabinet. Terminals D+ and D- are connected to DALI bus. The polarity does not have to be observed.

Terminals "230V" are connected to mains power supply.

SubD9 port (RS232) serves the connection of PC/laptop or AMS control via RS232 port.

### **Note:**

*If using COMM-TEC interface CTG-DALI no control unit to be Mains power supply for CTG-DALI. Additional adaptors are not to be*



*DALI further DALI integrated. DALI via power connected.*

## 2.3 Installation RS232 Port

The gateway is connected via 5-core cable to serial interface (RS232) of NetLinx master (pin assignment see 2.3.1).

**CAUTION!** No further pins to be connected!

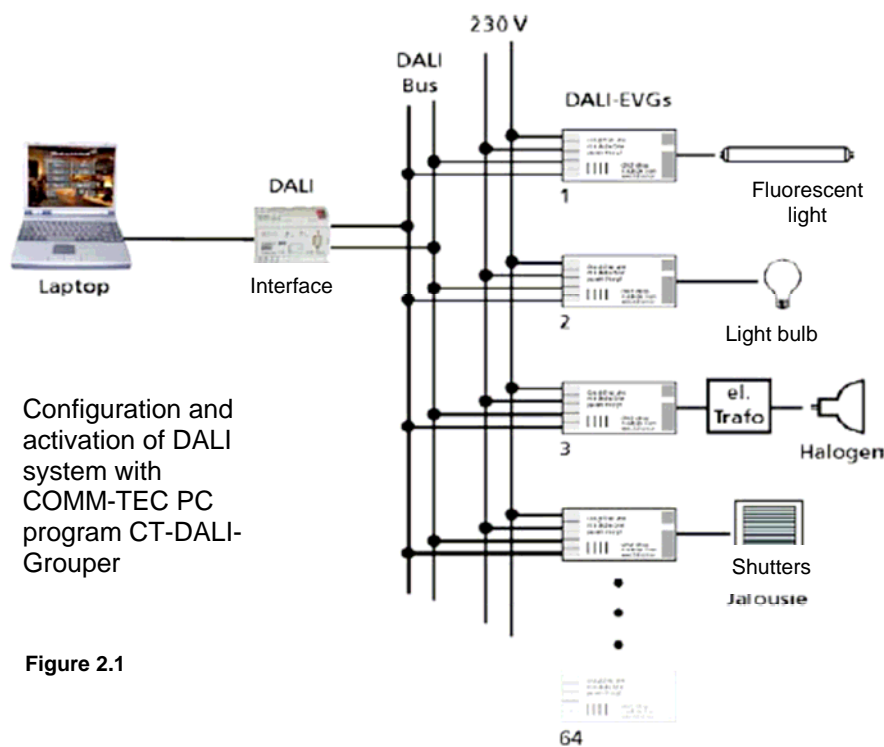
The necessary settings of serial RTI interface (baud rate, parity, etc.) are automatically carried out by RTI module.

### 2.3.1 Pin Assignment

PC RS232 9-pin SubD male	Gateway 9-pin SubD female	RTI Controller NI series 9-pin SubD male	RTI Controller all
Pin	Pin	Pin	Description
n.c.	1	n.c.	n.c.
2	2	2	RxD
3	3	3	TxD
n.c.	4	n.c.	n.c.
5	5	5	GND
n.c.	6	n.c.	n.c.
7	7	7	CTS
8	8	8	RTS
n.c.	9	n.c.	n.c.

### 2.4 Activation Of DALI Devices With CTG-DALI-Grouper

All DALI devices connected via DALI bus have got a short address (0-63) ex factory. Thus with DALI activation first addressing has to be performed. For this COMM-TEC provides you with the



PC program CT-DALI-Grouper. For individual steps please refer to the separate manual.

After successful configuration connect serial interface of RTI NetLinx control system to RS232 interface of DALI gateway CTG-DALI (pin assignment see 2.3).

## 2.5 Integration of RTI Driver Software CTDALI for RTI Controller

The supplied CD contains the finished module in compiled runtime version, meaning it is not available as NetLinx source code. It is integrated in your main program after section `DEFINE_START` (see sample program in appendix).

Additionally in section `DEFINE_VARIABLE` three variables containing status and value messages and defining the number of EVGs for acknowledgements are to be declared.

### 2.5.1 Files On Your Computer

By integrating the supplied `SYSTEM_CALLs` in the main program control functions on DALI bus are actuated.

For enabling the NetLinx Compiler to integrate the `SYSTEM_CALLs`, these must be copied before use into a folder on hard drive. Into which folder they are to be copied depends on the installation of the RTI software. In standard installation all `SYSTEM_CALLs` are stored in folder "C:\Programme\Gemeinsame Dateien\RTI Share\SYCS".

Please copy all \*.LIB files there.

### 2.5.2 Communication With The Module

The module demands two addresses – firstly the interface to which the gateway is physically connected, and secondly a virtual interface, via which the complete communication runs. To differentiate, the following terms are used:

Physical interface:	<b>DEV</b>
Virtual interface:	<b>vDEV</b>

From the program only the virtual interface is accessed, the physical interface only appears in section `DEFINE_DEVICE` and in access of the module.

### 2.5.3 `SYSTEM_CALLs`

The package CTDALI1 includes 5 `SYSTEM_CALLs` to be integrated into the main program for activation.

The current acknowledgement values and status messages are available in acknowledgement arrays.

### 2.5.4 Addressing

One DALI line can manage up to 64 bus participants, numbered 0-63 in DALI jargon. In the RTI world this numbering is changed, so that no individual participant “0” exists.

Furthermore, the groups 1-16 (DALI 0-15) are accessible.

The address 0 serves the global addressing of all participants of a line, meaning:

Address	Description <b>RTI</b>	Term <b>DALI</b>
0	broadcast, all participants	broadcast
1-64	EVG 1-64	addresses 0-63
101-116	groups 1-16	group 0-15

Current brightness values of the maximum 64 addresses can be provided.

Error values (lights/EVGs) can be provided.

### 2.6 Individual RTI Programming

If you choose not to use SYSTEM\_CALLs, all commands may be triggered in virtual device with SEND\_COMMANDs.

Both alternatives are given in the examples. Caution: If using the SEND\_COMMANDs the command syntax has to be carefully observed.

### 2.6.1 Direct Control Of Brightness Value

Brightness values see table 2.

**SYSTEM\_CALL 'CT\_DALI\_1\_SetAbs\_NX'** (<virtual DALI address>,  
<DALI address>,  
<brightness value>,  
<speed>)

Meaning of parameters:

<virtual DALI address>

- virtual device address, via which the module communicates with the gateway

<DALI address>

- #0 broadcast  
#1-64 individual address  
#101-116 group address  
(see table 2)  
- 0-254 (see table 2)  
- 0-15 (see table 1)

<brightness value>

<speed>

Examples:

Set all participants of group 3 with maximum speed to maximum value:

```
SYSTEM_CALL 'CT_DALI_1_SetAbs_NX' (vdvDALI, 103, 254, 0) |  
SEND_COMMAND vdvDALI, 'SetAbs-103:254:0)
```

Set bus participant #14 (DALI address 13!) within 16 seconds from current to 80% (value from table 2):

```
SYSTEM_CALL 'CT_DALI_1_SetAbs_NX' (vdvDALI, 14, 246, 10)  
SEND_COMMAND vdvDALI, 'SetAbs-14:246:10)
```

#### Note:

Alternatively, with SEND\_COMMANDs the brightness value can be given as a percentage. The value input has to be directly followed by "P".

Set bus participant #14 (DALI address 13!) within 16 seconds from current to 80%:

```
SEND_COMMAND vdvDALI, 'SetAbs-14:80P:10)|
```

## 2.6.2 Access Maximum, Minimum Value

**SYSTEM\_CALL 'CT\_DALI\_1\_SetMax\_NX'** (<virtual DALI address>,  
<DALI address>)  
**SYSTEM\_CALL 'CT\_DALI\_1\_SetMin\_NX'** (<virtual DALI address>,  
<DALI address>)

Meaning of parameters:

<virtual DALI address>

- virtual device address (see above)

<DALI address>

- #0

broadcast

#1-64

individual address

#101-116

group address

Examples:

Set all participant of group 3 to maximum value:

```
SYSTEM_CALL 'CT_DALI_1_SetMax_NX' (vdvDALI,103)  
SEND_COMMAND vdvDALI,'SetMax-103)
```

Set bus participant #14 (DALI address 13!) to maximum value:

```
SYSTEM_CALL 'CT_DALI_1_SetMin_NX' (vdvDALI,14)  
SEND_COMMAND vdvDALI,'SetMin-14)
```

## 2.6.3 Scene Access

Every bus participant can store up to 16 scene values.

**SYSTEM\_CALL 'CT\_DALI\_1\_Scene\_NX'** (<virtual DALI address>,  
<DALI address>,  
<value>,  
<speed>)

Meaning of parameters:

<virtual DALI address>

- virtual device address (see above)

<DALI address>

- #0

broadcast

#1-64

individual address

#101-116

group address

<value>

- scene number (1-15)

<speed>

- 0-15

(see table 1)

Examples:

Set all participant of group 3 within 2.8 seconds to scene 15:

```
SYSTEM_CALL 'CT_DALI_1_Scene_NX' (vdvDALI,103,15,5)  
SEND_COMMAND vdvDALI,'SetScene-103:15:5)
```

Set bus participant #14 (DALI address 13!) within 32 seconds to its value for scene 8:

```
SYSTEM_CALL 'CT_DALI_1_Scene_NX' (vdvDALI,14,8,12)  
SEND_COMMAND vdvDALI,'SetScene-14:8:12)
```

## 2.6.4 Relative Dimming

Continuous change of brightness;

Please remember: the started dimming process must be ended!

Note: these commands for relative dimming do not switch the concerned EVG on or off.

**SYSTEM\_CALL 'CT\_DALI\_1\_Dimm\_NX'** (<virtual DALI address>,  
<DALI address>,  
<direction>,  
<speed>)

Meaning of parameters:

<virtual DALI address>

<DALI address>

<direction>

<speed>

- virtual device address (see above)

- #0 broadcast

#1-64 individual address

#101-116 group address

- 1 – brighter; 2 – darker; 0 – stop

- 1-15

Examples:

Set all participant of group 3 fast brighter:

```
SYSTEM_CALL 'CT_DALI_1_Dimm_NX'(vDvDALI,103,1,1)|
SEND_COMMAND vDvDALI,'Dimm-103:1:1)
:
```

Stop dimming for bus participant #14 (DALI address 13!):

```
SYSTEM_CALL 'CT_DALI_1_Dimm_NX'(vDvDALI,14,0,1)
SEND_COMMAND vDvDALI,'Dimm-14:0:1)
```

## 2.6.5 Set Scene Value

Description of EVG with certain value for a certain scene.

**SYSTEM\_CALL 'CT\_DALI\_1\_Set\_Scene\_Val\_NX'** (<virtual DALI address>,  
<DALI address>,  
<value 1>,  
<value 2>)

Meaning of parameters:

<virtual DALI address>

<DALI address>

<value 1>

<value 2>

- virtual device address (see above)

- Caution! Here only individual address valid

#1-64 individual address

- scene number (1-15)

- 0-254 (see table 2)

Examples:

Set scene value #11 of EVG #23 to 100%:

```
SYSTEM_CALL 'CT_DALI_1_SetSceneVal_NX'(vDvDALI,23,11,254)
SEND_COMMAND vDvDALI,'SetSceneVal-23:11:254)
```

### 2.6.6 Further Access Options

All selectable addresses (0 for broadcast; 1-64 for individual EVGs and 101-116 for the groups) are mapped directly on levels in the module, meaning they can alternatively be controlled via command SEND\_LEVEL (see example program).

### 2.6.7 Acknowledgements

With the integration of the module two data fields are created (see example) containing the acknowledgements of EVGs.

When activated all values below this threshold and > 0 correspond with the minimum value.

The first data field contains the current brightness value of the corresponding EVG; theoretically values between 0 and 254 are possible. Only theoretically, because most DALI electronic ballasts have a minimum value of either 1% (corresponds to value 85) or 3% (corresponds to value 126).

The second data field contains possible error messages. The values have the following meaning:

- |                    |                        |
|--------------------|------------------------|
| - 0                | - ok                   |
| - 2                | - light fitting error  |
| - all other values | -bus error / error EVG |

### 2.6.8 Error Analysis

In the module channel 127 can be switched on for error analysis. The monitor displays plain text messages, which may contain important information.

Proceed as follows:

- Start a monitor connection to master (serial or via Telnet)
- Activate local echo                      echo on
- Activate plain text messages      msg on
- Activate messages module          on [vdrvDALI,127]

Now also all control commands for testing may be input via SEND\_COMMANDs (description see above under SYSTEM\_CALLs).

Example:

Set all EVGs immediately to minimum value:

```
SEND_COMMAND vdrvDALI, 'SetMax-0'|
```

Set all EVGs of group 5 to scene value 12 within 2 seconds:

```
SEND_COMMAND vdrvDALI, 'SetScene-105:12:4'
```

Switch off EVG 1 (DALI #0!) immediately:

```
SEND_COMMAND vdrvDALI, 'SetAbs-1:0:0'
```

### 3 Further Information

#### 3.1 What Is DALI? Fundamentals, Figures, Data And Facts

DALI stands for “Digital Addressable Lighting Interface” and is the definition for the standardized digital device interface and was created by the manufacturers of these devices.

With this standard the compatibility of device of different manufacturers such as Osram, Tridonic, Helvar or Philips in a lighting installation is guaranteed.

DALI is not a new system for central building control systems such as LON, EIB or Luxmate but a meaningful addition for practical application of lighting control. The reason: Systems such as EIB and LON are designed for much more complex tasks within the building and are thus more expensive.

With the DALI technology innovative, flexible, easy and cost efficient solutions can be put into practice. DALI replaces here the 1-10V control technology of electronic ballasts for lighting (EVG) and will replace them medium-term.

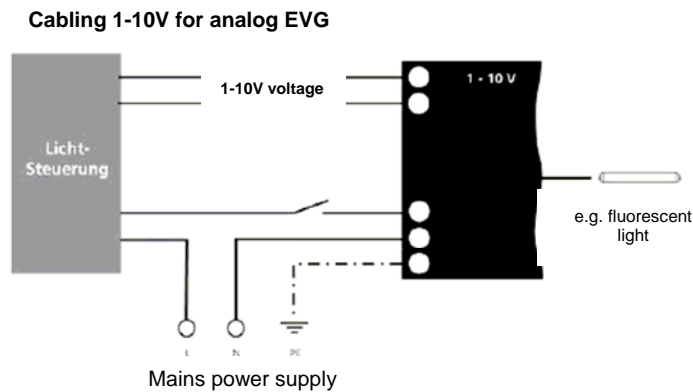


Figure 1.1

EVGs and other devices such as transformers are mandatory for several illuminants, such as fluorescent lights or halogen lights. For the dimming of fluorescent lights controllable EVGs are mandatory. Until today so-called analog 1-10V EVGs were utilized.

Disadvantage: inaccurate control and costly installations.

Additionally, analog EVGs with 1-10V control need a switched 230V signal e.g. via a relay for on/off switching (figure 1.1).

This can be dropped for DALI compatible devices. Every DALI device still needs 230V power supply, but the electronics for dimming 0-100% are located in the DALI EVG (figure 1.2). Via the digital, bi-directional control with DALI EVGs the actions are actuated right in the DALI device – with this also acknowledgement of devices (e.g. defective light fitting) is possible. To operate a DALI system controls are mandatory.

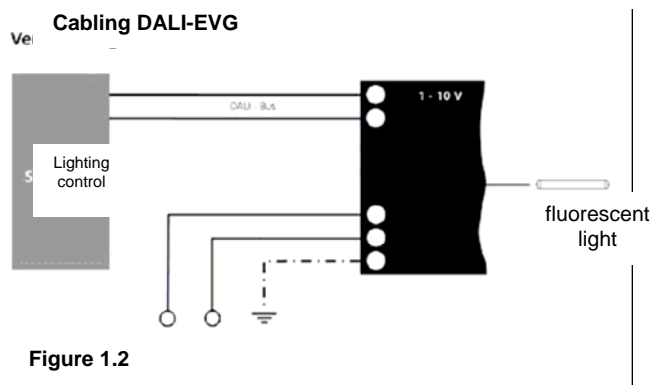


Figure 1.2

DALI provides among others the following functions:

- Available DALI actuators: EVGs for fluorescent lights, phase control dimmers, shutter actuators, relays, etc.
- Easy cabling of control wire
- One DALI system consists of:
  - max. 64 individual devices
  - max. 16 groups
  - max. 16 scenes
- Synchronized scene transmissions, meaning all accessed light fittings reach their target brightness at the same time
- Groups and scene values are stores in the DALI device
- Status display such as light fitting error
- Adjustment of threshold values, dimming speed
- Emergency power features

Further information under: [www.dali-ag.org](http://www.dali-ag.org)

## **4. Appendix**

### **A. Table 1 - Times**

Times for the setting of absolute values or scenes

Value	Duration
0	< 0.7 sec
1	0.7 sec
2	1.0 sec
3	1.4 sec
4	2.0 sec
5	2.8 sec
6	4.0 sec
7	5.6 sec
8	8.0 sec
9	11.3 sec
10	16.0 sec
11	22.6 sec
12	32.0 sec
13	45.2 sec
14	64.0 sec
15	90.5 sec

**B. Table 2 – Dimming Values**

Luminous flux    Digital dimming value

0%	0	\$00
0.1%	1	\$01
0.5%	60	\$3C
1.0%	85	\$55
3%	126	\$7E
5%	144	\$90
10%	170	\$AA
20%	195	\$C3
30%	210	\$D2
40%	220	\$DC
50%	229	\$E5
60%	235	\$EB
70%	241	\$F1
80%	246	\$F6
90%	250	\$FA
100%	254	\$FE

### C. ABCD

Baud Rate:	19200	Parity:	None	Data Bits:	8	Stop Bits:	1
Add String		Delete String		Duplicate String		View As: HEX ASCII	

Function ▲	String	Comment
All Dimm (-)	00 FF 02 0D	All groups (0-15) (FF) dimm (-) (02)
All Dimm (-) + OFF	00 FF 07 0D	All groups (0-15) (FF) dimm + switch off (07)
All max.	00 FF 05 0D	All groups (0-15) (FF) switch on max. (05)
All min.	00 FF 06 0D	All groups (0-15) (FF) switch on min. (06)
All OFF	00 FF 00 0D	All groups (0-15) (FF) switch off (00)
All ON + Raise (+)	00 FF 08 0D	All groups (0-15) (FF) switch on + raise (-) (08)
All Raise (+)	00 FF 01 0D	Raise (+) all (FF) groups (0-15)
Group 0 Dimm (-)	00 81 02 0D	Group 0 (81) dimm (-) (02)
Group 0 Dimm (-) + OFF	00 81 07 0D	Group 0 (81) dimm (-) + switch off (07)
Group 0 max.	00 81 05 0D	Group 0 (81) on max. (05)
Group 0 min.	00 81 06 0D	Group 0 (81) on min. (06)
Group 0 OFF	00 81 00 0D	Group 0 (81) off (00)
Group 0 ON + Raise (+)	00 81 08 0D	Group 0 (81) on + raise (+) (08)
Group 0 Raise (+)	00 81 01 0D	Group 0 (81) raise (+) (01)
Group 01 Dimm (-)	00 83 02 0D	Group 1 (83) dimm (-) (02)
Group 01 Dimm (-) + OFF	00 83 07 0D	Group 01 (83) dimm (-) + switch off (07)
Group 01 max.	00 83 05 0D	Group 01 (83) on max. (05)
Group 01 min.	00 83 06 0D	Group 01 (83) on min. (06)
Group 01 OFF	00 83 00 0D	Group 1 (83) off (00)
Group 01 ON + Raise (+)	00 83 08 0D	Group 1 (83) on + raise (+) (08)
Group 01 Raise (+)	00 83 01 0D	Group 1 (83) raise (+) (01)
Group 02 Dimm (-)	00 85 02 0D	Group 2 (85) dimm (-) (02)
Group 02 Dimm (-) + OFF	00 85 07 0D	Group 02 (85) dimm (-) + switch off (07)
Group 02 max.	00 85 05 0D	Group 02 (85) on max. (05)
Group 02 min.	00 85 06 0D	Group 02 (85) on min. (06)
Group 02 OFF	00 85 00 0D	Group 2 (85) off (00)
Group 02 ON + Raise (+)	00 85 08 0D	Group 2 (85) on + raise (+) (08)
Group 02 Raise (+)	00 85 01 0D	Group 2 (85) raise (+) (01)
Group 03 Dimm (-)	00 87 02 0D	Group 3 (87) dimm (-) (02)
Group 03 Dimm (-) + OFF	00 87 07 0D	Group 03 (87) dimm (-) + switch off (07)
Group 03 max.	00 87 05 0D	Group 03 (87) on max. (05)
Group 03 min.	00 87 06 0D	Group 03 (87) on min. (06)
Group 03 OFF	00 87 00 0D	Group 3 (87) off (00)
Group 03 ON + Raise (+)	00 87 08 0D	Group 3 (87) on + raise (+) (08)

Function ▲	String	Comment
Group 03 Raise (+)	00 87 01 0D	Group 3 (87) raise (+) (01)
Group 04 Dimm (-)	00 89 02 0D	Group 4 (89) dimm (-) (02)
Group 04 Dimm (-) + OFF	00 89 07 0D	Group 04 (89) dimm (-) + switch off (07)
Group 04 max.	00 89 05 0D	Group 04 (89) on max. (05)
Group 04 min.	00 89 06 0D	Group 04 (89) on min. (06)
Group 04 OFF	00 89 00 0D	Group 4 (89) off (00)
Group 04 ON + Raise (+)	00 89 08 0D	Group 4 (89) on + raise (+) (08)
Group 04 Raise (+)	00 89 01 0D	Group 4 (89) raise (+) (01)
Group 05 Dimm (-)	00 8B 02 0D	Group 5 (8B) dimm (-) (02)
Group 05 Dimm (-) + OFF	00 8B 07 0D	Group 05 (8B) dimm (-) + switch off (07)
Group 05 max.	00 8B 05 0D	Group 05 (8B) on max. (05)
Group 05 min.	00 8B 06 0D	Group 05 (8B) on min. (06)
Group 05 OFF	00 8B 00 0D	Group 5 (8B) off (00)
Group 05 ON + Raise (+)	00 8B 08 0D	Group 5 (8B) on + raise (+) (08)
Group 05 Raise (+)	00 8B 01 0D	Group 5 (8B) raise (+) (01)
Group 06 Dimm (-)	00 8D 02 0D	Group 6 (8D) dimm (-) (02)
Group 06 Dimm (-) + OFF	00 8D 07 0D	Group 06 (8D) dimm (-) + switch off (07)
Group 06 max.	00 8D 05 0D	Group 06 (8D) on max. (05)
Group 06 min.	00 8D 06 0D	Group 06 (8D) on min. (06)
Group 06 OFF	00 8D 00 0D	Group 6 (8D) off (00)
Group 06 ON + Raise (+)	00 8D 08 0D	Group 6 (8D) on + raise (+) (08)
Group 06 Raise (+)	00 8D 01 0D	Group 6 (8D) raise (+) (01)
Group 07 Dimm (-)	00 8F 02 0D	Group 7 (8F) dimm (-) (02)
Group 07 Dimm (-) + OFF	00 8F 07 0D	Group 07 (8F) dimm (-) + switch off (07)
Group 07 max.	00 8F 05 0D	Group 07 (8F) on max. (05)
Group 07 min.	00 8F 06 0D	Group 07 (8F) on min. (06)
Group 07 OFF	00 8F 00 0D	Group 7 (8F) off (00)
Group 07 ON + Raise (+)	00 8F 08 0D	Group 7 (8F) on + raise (+) (08)
Group 07 Raise (+)	00 8F 01 0D	Group 7 (8F) raise (+) (01)
Group 08 Dimm (-)	00 91 02 0D	Group 8 (91) dimm (-) (02)
Group 08 Dimm (-) + OFF	00 91 07 0D	Group 08 (91) dimm (-) + switch off (07)
Group 08 max.	00 91 05 0D	Group 08 (91) on max. (05)
Group 08 min.	00 91 06 0D	Group 08 (91) on min. (06)
Group 08 OFF	00 91 00 0D	Group 8 (91) off (00)

Function ▲	String	Comment
Group 08 ON + Raise (+)	00 91 08 0D	Group 8 (91) on + raise (+) (08)
Group 08 Raise (+)	00 91 01 0D	Group 8 (91) raise (+) (01)
Group 09 Dimm (-)	00 93 02 0D	Group 9 (93) dimm (-) (02)
Group 09 Dimm (-) + OFF	00 93 07 0D	Group 09 (93) dimm (-) + switch off (07)
Group 09 max.	00 93 05 0D	Group 09 (93) on max. (05)
Group 09 min.	00 93 06 0D	Group 09 (93) on min. (06)
Group 09 OFF	00 93 00 0D	Group 9 (93) off (00)
Group 09 ON + Raise (+)	00 93 08 0D	Group 9 (93) on + raise (+) (08)
Group 09 Raise (+)	00 93 01 0D	Group 9 (93) raise (+) (01)
Group 10 Dimm (-)	00 95 02 0D	Group 10 (95) dimm (-) (02)
Group 10 Dimm (-) + OFF	00 95 07 0D	Group 10 (95) dimm (-) + switch off (07)
Group 10 max.	00 95 05 0D	Group 10 (95) on max. (05)
Group 10 min.	00 95 06 0D	Group 10 (95) on min. (06)
Group 10 OFF	00 95 00 0D	Group 10 (95) off (00)
Group 10 ON + Raise (+)	00 95 08 0D	Group 10 (95) on + raise (+) (08)
Group 10 Raise (+)	00 95 01 0D	Group 10 (95) raise (+) (01)
Group 11 Dimm (-)	00 97 02 0D	Group 11 (97) dimm (-) (02)
Group 11 Dimm (-) + OFF	00 97 07 0D	Group 11 (97) dimm (-) + switch off (07)
Group 11 max.	00 97 05 0D	Group 11 (97) on max. (05)
Group 11 min.	00 97 06 0D	Group 11 (97) on min. (06)
Group 11 OFF	00 97 00 0D	Group 11 (97) off (00)
Group 11 ON + Raise (+)	00 97 08 0D	Group 11 (97) on + raise (+) (08)
Group 11 Raise (+)	00 97 01 0D	Group 11 (97) raise (+) (01)
Group 12 Dimm (-)	00 99 02 0D	Group 12 (99) dimm (-) (02)
Group 12 Dimm (-) + OFF	00 99 07 0D	Group 12 (99) dimm (-) + switch off (07)
Group 12 max.	00 99 05 0D	Group 12 (99) on max. (05)
Group 12 min.	00 99 06 0D	Group 12 (99) on min. (06)
Group 12 OFF	00 99 00 0D	Group 12 (99) off (00)
Group 12 ON + Raise (+)	00 99 08 0D	Group 12 (99) on + raise (+) (08)
Group 12 Raise (+)	00 99 01 0D	Group 12 (99) raise (+) (01)
Group 13 Dimm (-)	00 9B 02 0D	Group 13 (9B) dimm (-) (02)
Group 13 Dimm (-) + OFF	00 9B 07 0D	Group 13 (9B) dimm (-) + switch off (07)
Group 13 max.	00 9B 05 0D	Group 13 (9B) on max. (05)
Group 13 min.	00 9B 06 0D	Group 13 (9B) on min. (06)
Group 13 OFF	00 9B 00 0D	Group 13 (9B) off (00)
Group 13 ON + Raise (+)	00 9B 08 0D	Group 13 (9B) on + raise (+) (08)
Group 13 Raise (+)	00 9B 01 0D	Group 13 (9B) raise (+) (01)
Group 14 Dimm (-)	00 9D 02 0D	Group 14 (9D) dimm (-) (02)
Group 14 Dimm (-) + OFF	00 9D 07 0D	Group 14 (9D) dimm (-) + switch off (07)
Group 14 max.	00 9D 05 0D	Group 14 (9D) on max. (05)
Group 14 min.	00 9D 06 0D	Group 14 (9D) on min. (06)
Group 14 OFF	00 9D 00 0D	Group 14 (9D) off (00)
Group 14 ON + Raise (+)	00 9D 08 0D	Group 14 (9D) on + raise (+) (08)
Group 14 Raise (+)	00 9D 01 0D	Group 14 (9D) raise (+) (01)
Group 15 Dimm (-)	00 9F 02 0D	Group 15 (9F) dimm (-) (02)
Group 15 Dimm (-) + OFF	00 9F 07 0D	Group 15 (9F) dimm (-) + switch off (07)
Group 15 max.	00 9F 05 0D	Group 15 (9F) on max. (05)
Group 15 min.	00 9F 06 0D	Group 15 (9F) on min. (06)
Group 15 OFF	00 9F 00 0D	Group 15 (9F) off (00)
Group 15 ON + Raise (+)	00 9F 08 0D	Group 15 (9F) on + raise (+) (08)
Group 15 Raise (+)	00 9F 01 0D	Group 15 (9F) raise (+) (01)